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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/332,886	06/15/1999	ROBERT A. LAZARUS	RU-0064	3466

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EXAMINER	
PAK, YONG D	

ART UNIT	PAPER NUMBER
1652	

DATE MAILED: 05/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/332,886	LAZARUS ET AL.	
	Examiner	Art Unit	
	Yong D. Pak	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) *5-8,12-22,26-28 and 32-41* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,9-11,23-25 and 29-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/1/2000*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This application is a continuation of 08/749,337, issued as U.S. Patent No. 5,912,161, which is a continuation of07/941,414, issued as U.S. Patent No. 5,376,544.

Claims 1-41 are pending. Claims 5-8, 12-22, 26-28 and 32-41 are withdrawn. Claims 1-4, 9-11, 23-25 and 29-31 are under consideration.

Election/Restrictions

Applicant's election with traverse of Group I (claims 1-4, 9-11, 23-25 and 29-31) in the reply filed on June 1, 2006 and election of the species mutant 2,5-DKG reductase having amino acid substitutions at positions 2, 5, 7, 55, 57 and 192 in the reply filed on February 17, 2006 is acknowledged. The traversal is on the ground(s) that the claimed species of mutant 2,5-DKG reductase are so closely related that a search and examination of all species can be made by the Examiner without serious burden. The species election is withdrawn.

However, the restriction requirement is still deemed proper and is therefore made FINAL.

Claims 5-8, 12-22, 26-28 and 32-41 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on June 1, 2005.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on July 1, 200 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-4, 9-11, 23-25 and 29-31 are rejected under 35 U.S.C. 101 because the claimed invention is directed to a non-statutory subject matter.

Claims 1-4, 9-11, 23-25 and 29-31, as written, do not sufficiently distinguish over 2.5-DKG reductase as they exist naturally because the claims do not particularly point out any non-naturally occurring differences between the claimed products and the naturally occurring products, such as being "isolated". Even though the claims are drawn to mutant 2,5-DKG reductase, such mutants can exist naturally. In the absence of the hand of man, the naturally occurring products are considered non-statutory subject matter. See Diamond v. Chakrabarty, 447 U.S. 303, 206 USPQ 193 (1980). The claims should be amended to indicate the hand of the inventor, e.g., by insertion of "isolated" as taught by the specification. See MPEP 2105.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-2, 9-10, 23-24 and 29-30 and claims 3-4, 11, 25 and 31 depending therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-2, 9-10, 23-24 and 29-30 recite the terms "2,5-DKG" and/or "2-KLG". The metes and bounds of the terms in the context of the claims are not clear. It is not clear to the Examiner what the terms stand for. It appears that applicant may have used it as a short form for "2,5-diketo-D-gluconic acid" or "2-keto-L-gulonic acid". If that is so, reciting the full name of the compounds would overcome the rejection.

Claims 2-4, 10-11, 24-25 and 30-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2-4, 10-11, 24-25 and 30-31 recite the phrase "having an amino acid substitution in position...". The metes and bounds of the phrase in the context of the claims are not clear. Since applicants do not provide a specific amino acid sequence for the 2,5-DKG, it will be impossible for the Examiner to do a meaningful search of the claim limitations. Examiner requests clarification and insertion of the amino acid sequence of the 2, 5-DKG reductase A.

Claims 1, 9, 23 and 29 and claims 2-4, 10-11, 24-25 and 30-31 depending therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 9, 23 and 29 recite the phrases "improved ability to convert 2,5-DKG into 2-KLG", "increased expression" and/or "improved temperature stability". The metes and bounds of the phrase in the context of the above claims are not clear to the Examiner. It is not clear to the Examiner as to how much of an increase in the "conversion of 2,5-DKG into 2-KLG" or "temperature stability" is considered as "improved ability to convert 2,5-DKG into 2-KLG" or "improved temperature stability" by the applicants. Further, it is not clear to the Examiner to what "2,5-DKG reductase A" "temperature stability", "expression" or "conversion of 2,5-DKG into 2-KLG" of the mutants are compared to. A perusal of the specification did not provide a clear definition for the above phrase. Without a clear definition in terms of numerical value, those skilled in the art would be unable to conclude what is "improved ability to convert 2,5-DKG into 2-KLG", "increased expression" and/or "improved temperature stability". Examiner requests clarification of the above phrases.

Claims 9 and 29 and claims 10-11 and 30-31 depending therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 9 and 29 recite the phrase "2,5-DKG reductase A having increased expression ". The metes and bounds of this phrase in the context of the claims are not clear to the Examiner. It is not clear to the Examiner how an enzyme has increased expression because expression is a process during which a gene's coded information is transcribed into mRNA and then translated into protein. Therefore, it is not clear to the Examiner either from the specification or from the claim as to what applicants mean by a reductase having "increased expression". Examiner requests clarification of the above phrase.

Claims 2-3, 10-11, 24-25 and 30-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2-3, 10-11, 24-25 and 30-31 recite the term "having". The metes and bounds of this term in the context of the above claims are not clear to the Examiner. It is not clear to the Examiner whether the reductase consists of substitutions at the recited positions or comprises of substitutions at the recited positions because the term "having" in transitional phrases does not create a presumption that the body of the claim is open (See MPEP 2111.03). A perusal of the specification did not provide the Examiner with a specific definition for the above term. As applicants have not provided a definition for the above term, Examiner has interpreted the claims broadly to mean that a reductase having substitutions at the recited positions is a reductase "comprising" the recited positions. Examiner requests clarification of the above phrase.

Claims 1 and 29 and claims 2-4 and 30-31 depending therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 29 recite the term "ability". A polypeptide that has an "ability" of catalyzing a reaction conveys that the polypeptide catalyzes the reaction under some conditions but may have the same properties under all or other conditions. A polypeptide "able" of exhibiting a given activity may not have such property at all times or that such property is inherent to said polypeptide. Therefore, it is not clear what are those conditions in which the polypeptides has the "ability" of catalyzing the reaction recited in the above claims. Examiner requests clarification of the above term and suggests deleting said term.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> **The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.**

Claims 1-4, 9-11, 23-25 and 29-31 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the

inventor(s), at the time the application was filed, had possession of the claimed invention. (See rejection of 2-3, 10-11, 24-25 and 30-31 under 35 USC 112, 2nd paragraph for the term "having").

Claims 1-4, 9-11, 23-25 and 29-31 are drawn to a mutant of any 2,5-DKG reductase A "having" substitutions at position 2, 5, 7, 55, 57, 165, 166, 167, 168, 187, 188, 189, 190, 191, 192, 193, 194, 196, 198, 224, 226, 227, 228, 229, 230, 231, 232, 233, 234, 262, 263, 264, 265, 266, 267, 268, 269, 271, 274, 277, and/or 278 having improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability. The claims encompass mutants of any 2,5-DKG reductase A obtained from any source, including any or all mutants, recombinants or variants thereof, comprising substitutions at the recited positions and any other amino acid positions. The limitation of comprising substitutions at the recited positions provides no description on the structure of other parts of the mutant 2,5-DKG reductase A. While the mutant comprises substituted amino acids at positions 2, 5, 7, 55, 57, 165, 166, 167, 168, 187, 188, 189, 190, 191, 192, 193, 194, 196, 198, 224, 226, 227, 228, 229, 230, 231, 232, 233, 234, 262, 263, 264, 265, 266, 267, 268, 269, 271, 274, 277, and/or 278, the same mutant can comprise any amino acids in other positions. Therefore, the claims are drawn to a genus comprising mutant 2,5-DKG reductase A having any structure, including any or all recombinants, mutants and variants, including those that comprise substitutions at the recited positions. The specification only describes one representative species of a mutant of 2,5-DKG reductase having the amino acid sequence of SEQ ID NO:1 consisting of substitutions at positions 2, 5, 7, 55, 57 and/or

192 and wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability. One species is not enough and does not constitute a representative number of species to describe the whole genus and there is no evidence on the record of the relationship between the structure of a 2,5-DKG reductase A of SEQ ID NO:1 and the structure of any 2,5-DKG reductase A, including any or all recombinants, variants and mutants. Therefore, the specification fails to describe a representative species of the genus comprising mutants of any or all 2,5-DKG reductase, including any or all variants, recombinants and mutants.

Given this lack of description of the representative species encompassed by the genus of the claims, the specification fails to sufficiently describe the claimed invention in such full, clear, concise, and exact terms that a skilled artisan would recognize that applicants were in possession of the inventions of claims 1-4, 9-11, 23-25 and 29-31.

Applicant is referred to the revised guidelines concerning compliance with the written description requirement of U.S.C. 112, first paragraph, published in the Official Gazette and also available at www.uspto.gov.

Claims 1-4, 9-11, 23-25 and 29-31 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a mutant of 2,5-DKG reductase having the amino acid sequence of SEQ ID NO:1 consisting of substitutions at positions 2, 5, 7, 55, 57, 165, 166, 167, 168, 187, 188, 189, 190, 191, 192, 193, 194, 196, 198, 224, 226, 227, 228, 229, 230, 231, 232, 233, 234, 262, 263, 264, 265, 266, 267, 268, 269, 271, 274, 277, and/or 278 and wherein said mutant has improved ability

to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability, does not reasonably provide enablement for mutants of any 2,5-DKG reductase A obtained from any source, including any or all mutants, recombinants or variants thereof, comprising substitutions at position 2, 5, 7, 55, 57, 165, 166, 167, 168, 187, 188, 189, 190, 191, 192, 193, 194, 196, 198, 224, 226, 227, 228, 229, 230, 231, 232, 233, 234, 262, 263, 264, 265, 266, 267, 268, 269, 271, 274, 277, and/or 278 and any other amino acid positions, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

Factors to be considered in determining whether undue experimentation is required are summarized in In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988). They include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.

Claims 1-4, 9-11, 23-25 and 29-31 are drawn to a mutant of any 2,5-DKG reductase A "having" substitutions at position 2, 5, 7, 55, 57, 165, 166, 167, 168, 187, 188, 189, 190, 191, 192, 193, 194, 196, 198, 224, 226, 227, 228, 229, 230, 231, 232, 233, 234, 262, 263, 264, 265, 266, 267, 268, 269, 271, 274, 277, and/or 278 having

improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability. The claims encompass mutants of any 2,5-DKG reductase A obtained from any source, including any or all mutants, recombinants or variants thereof, comprising substitutions at the recited positions and any other amino acid positions. The limitation of comprising substitutions at position 2, 5, 7, 55, 57, 165, 166, 167, 168, 187, 188, 189, 190, 191, 192, 193, 194, 196, 198, 224, 226, 227, 228, 229, 230, 231, 232, 233, 234, 262, 263, 264, 265, 266, 267, 268, 269, 271, 274, 277, and/or 278 provides no description on the structure of other parts of the mutant 2,5-DKG reductase A. While the mutant comprises substituted amino acids at positions 2, 5, 7, 55, 57, 165, 166, 167, 168, 187, 188, 189, 190, 191, 192, 193, 194, 196, 198, 224, 226, 227, 228, 229, 230, 231, 232, 233, 234, 262, 263, 264, 265, 266, 267, 268, 269, 271, 274, 277, and/or 278, the same mutant can comprise any amino acids in other positions. Therefore, the claims are drawn to mutant 2,5-DKG reductase A having any structure, including any or all recombinants, mutants and variants, including those that comprise substitutions at the recited positions The scope of the claims is not commensurate with the enablement provided by the disclosure with regard to the extremely large number of mutants of any or all 2,5-DKG reductase A, broadly encompassed by the claims.

Since the amino acid sequence of the encoded protein determines its structural and functional properties, predictability of which changes can be tolerated in a protein's amino acid sequence and obtain the desired activity requires a knowledge of and guidance with regard to which amino acids in the protein's sequence, if any, are tolerant

of modification and which are conserved (i.e. expectedly intolerant to modification), and detailed knowledge of the ways in which the proteins' structure relates to its function. However, in this case the disclosure is limited to a mutant of 2,5-DKG reductase having the amino acid sequence of SEQ ID NO:1 consisting of substitutions at positions 2, 5, 7, 55, 57 and/or 192 and wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability. It would require undue experimentation of the skilled artisan to produce mutants of any or all 2,5-DKG reductase A obtained from any source, including any or all variants, mutants and recombinants thereof. In view of the great breadth of the claim, amount of experimentation required to make the claimed polypeptides, the lack of guidance, working examples, and unpredictability of the art in predicting function from a polypeptide primary structure, the claimed invention would require undue experimentation. As such, the specification fails to teach one of ordinary skill how to use the full scope of the polypeptides encompassed by the claims.

While enzyme isolation techniques, recombinant and mutagenesis techniques are known, and it is routine in the art to screen for multiple substitutions or multiple modifications as encompassed by the instant claims, the specific amino acid positions within a protein's sequence where amino acid modifications can be made with a reasonable expectation of success in obtaining the desired activity/utility are limited in any protein and the result of such modifications is unpredictable. In addition, one skilled in the art would expect any tolerance to modification for a given protein to diminish with each further and additional modification, e.g. multiple substitutions.

The specification does not support the broad scope of the claims which encompass mutants of any 2,5-DKG reductase A obtained from any source, including any or all mutants, recombinants or variants thereof, comprising substitutions at position 2, 5, 7, 55, 57, 165, 166, 167, 168, 187, 188, 189, 190, 191, 192, 193, 194, 196, 198, 224, 226, 227, 228, 229, 230, 231, 232, 233, 234, 262, 263, 264, 265, 266, 267, 268, 269, 271, 274, 277, and/or 278 and any other amino acid positions, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability, because the specification does not establish: (A) regions of the structure of a 2,5-DKG reductase A which may be modified that results in improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability; (B) the general tolerance of a 2,5-DKG reductase A to modification and extent of such tolerance; (C) a rational and predictable scheme for modifying any amino acid residue with an expectation of obtaining the desired biological function; and (D) the specification provides insufficient guidance as to which of the essentially infinite possible choices is likely to be successful.

Thus, applicants have not provided sufficient guidance to enable one of ordinary skill in the art to make and use the claimed invention in a manner reasonably correlated with the scope of the claims broadly including mutants of any 2,5-DKG reductase A obtained from any source, including any or all mutants, recombinants or variants thereof, comprising substitutions at the recited positions and any other amino acid positions. The scope of the claims must bear a reasonable correlation with the scope of enablement (*In re Fisher*, 166 USPQ 19 24 (CCPA 1970)). Without sufficient guidance,

determination of a polynucleotide encoding any or all mutants and variants of any 2,5-DKG reductase A having the desired biological characteristics recited in the claim is unpredictable and the experimentation left to those skilled in the art is unnecessarily, and improperly, extensive and undue. See *In re Wands* 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-4, 9-11, 23-25 and 29-31 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of U. S. Patent No. 5,583,025. Although the conflicting claims are not identical, they are not patentably distinct from each other because they are claiming common subject matter, as follows: Claims 1-4, 9-11, 23-25 and 29-31 of the instant application and claims 1-9 of U. S. Patent No. 5,583,025 are both directed to a mutant of 2,5 reductase A comprising substitutions at positions 2, 5, 7, 55, 57 and 192 with asparagine,

threonine, serine, alanine, alanine and arginine, respectively, or comprising a substitution at position 165, 166, 167, 168, 187, 188, 189, 190, 191, 193, 194, 196, 198, 224, 226, 227, 228, 229, 230, 231, 232, 233, 234, 262, 263, 264, 265, 266, 267, 268, 269, 271, 274, 277, and/or 278, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability. The 2,5-DKG reductase A of SEQ ID NO:1 of the instant application is 100% identical to the 2,5-DKG reductase A of SEQ ID NO:1 of U. S. Patent No. 5,583,025 (See Sequence Alignment – US 5,583,025). Therefore, the conflicting claims are not patentably distinct from each other.

Claims 1-4, 9-11, 23-25 and 29-31 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U. S. Patent No. 5,376,544. Although the conflicting claims are not identical, they are not patentably distinct from each other because they are claiming common subject matter, as follows: Claims 1-4 of the instant application and claim 1 of U. S. Patent No. 5,376,544 are both directed to a mutant of 2,5 reductase A comprising substitutions at position 192 with arginine, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG. The 2,5-DKG reductase A of SEQ ID NO:1 of the instant application is 100% identical to the 2,5-DKG reductase A of SEQ ID NO:1 of U. S. Patent No. 5,376,544 (See Sequence Alignment – US 5,376,544).

Claims 1-4, 9-11, 23-25 and 29-31 of the instant application is drawn to a mutant of 2,5 reductase A comprising substitutions at positions 2, 5, 7, 55, 57 and 192 with

asparagine, threonine, serine, alanine, alanine and arginine, respectively, or comprising a s substitution at position, 165, 166, 167, 168, 187, 188, 189, 190, 191, 193, 194, 196, 198, 224, 226, 227, 228, 229, 230, 231, 232, 233, 234, 262, 263, 264, 265, 266, 267, 268, 269, 271, 274, 277, and/or 278, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability. Claim 1 of U. S. Patent No. 5,376,544 is drawn to a mutant of 2,5 reductase A comprising a substitution at position 192 with arginine, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG. A mutant of 2,5 reductase A comprising substitutions at positions 2, 5, 7, 55, 57 and 192 with asparagine, threonine, serine, alanine, alanine and arginine, respectively, or comprising a substitution at position, 165, 166, 167, 168, 187, 188, 189, 190, 191, 193, 194, 196, 198, 224, 226, 227, 228, 229, 230, 231, 232, 233, 234, 262, 263, 264, 265, 266, 267, 268, 269, 271, 274, 277, and/or 278, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability, is a specific embodiment of the mutant described in the reference patent. The specification of the reference patent supports a mutant of 2,5 reductase A of SEQ ID NO:1 comprising substitutions at positions 2, 5, 7, 55, 57 and 192 with asparagine, threonine, serine, alanine, alanine and arginine, respectively, or comprising a substitution at position, 165, 166, 167, 168, 187, 188, 189, 190, 191, 193, 194, 196, 198, 224, 226, 227, 228, 229, 230, 231, 232, 233, 234, 262, 263, 264, 265, 266, 267, 268, 269, 271, 274, 277, and/or 278, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability (Examples 6-7 of Columns

16-17) that would anticipate the mutant of claims 1-4, 9-11, 23-25 and 29-31. Claims 1-4, 9-11, 23-25 and 29-31 of the instant application cannot be considered patentably distinct over claim 1 of the reference application when there is specifically recited embodiment that would anticipate claims 1-4, 9-11, 23-25 and 29-31 of the instant application.

Alternatively, claims 1-4, 9-11, 23-25 and 29-31 of the instant application cannot be considered patentably distinct over claim 1 of the reference patent because it would have been obvious to one having ordinary skill in the art to modify claim 1 of the reference patent by selecting a specifically disclosed embodiment that supports those claimed, i.e. a mutant of 2,5 reductase A comprising substitutions at positions 2, 5, 7, 55, 57 and 192 with asparagine, threonine, serine, alanine, alanine and arginine, respectively, or comprising a substitution at position, 165, 166, 167, 168, 187, 188, 189, 190, 191, 193, 194, 196, 198, 224, 226, 227, 228, 229, 230, 231, 232, 233, 234, 262, 263, 264, 265, 266, 267, 268, 269, 271, 274, 277, and/or 278, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability. One of ordinary skill in the art would have been motivated to do this because the embodiments claimed in the instant claims are disclosed as being a preferred embodiment within claim 1 of the reference patent. Therefore, the conflicting claims are not patentably distinct from each other.

Claims 1-4, 9, 23 and 29 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U. S. Patent

No. 5,795,761. Although the conflicting claims are not identical, they are not patentably distinct from each other because they are claiming common subject matter, as follows: Claim 1 of the instant application and claims 1-12 of U. S. Patent No. 5,795,761are both directed to a mutant of 2,5 reductase A, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG. The 2,5-DKG reductase A of SEQ ID NO:1 of the instant application is 100% identical to the 2,5-DKG reductase A of SEQ ID NO:1 of U. S. Patent No. 5,795,761 (See Sequence Alignment – US 5,795,761).

Claims 1-4, 9, 23 and 29 of the instant application is drawn to a mutant of 2,5 reductase A comprising substitutions at position 192 with asparagine, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability. Claims 1-12 of U. S. Patent No. 5,795,761 is drawn to a mutant of 2,5 reductase A, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG. A mutant of 2,5 reductase A comprising substitutions at position 192 with asparagine, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability is a specific embodiments of the mutant described in the reference patent. The specification of the reference patent supports a mutant of 2,5 reductase A comprising substitutions at position 192, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability (Columns 5 and 7 and Example 4 of Column 18) that would anticipate the mutant of claims 1-4, 9, 23 and 29. Claims 1-4, 9, 23 and 29 of the instant application cannot be considered patentably

distinct over claims 1-12 of the reference application when there is specifically recited embodiment that would anticipate claims 1-4, 9, 23 and 29 of the instant application.

Alternatively, claims 1-4, 9, 23 and 29 of the instant application cannot be considered patentably distinct over claims 1-12 of the reference patent because it would have been obvious to one having ordinary skill in the art to modify claims 1-12 of the reference patent by selecting a specifically disclosed embodiment that supports those claimed, i.e. a mutant of 2,5 reductase A comprising substitutions at position 192 with arginine, wherein said mutant has improved ability to convert 2,5-DKG into 2-KLG, increased expression and/or improved temperature stability. One of ordinary skill in the art would have been motivated to do this because the embodiments claimed in the instant claims are disclosed as being a preferred embodiment within claims 1-12 of the reference patent. Therefore, the conflicting claims are not patentably distinct from each other.

None of the claims are allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yong Pak whose telephone number is 571-272-0935. The examiner can normally be reached 6:30 A.M. to 5:00 P.M. Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapu Achutamurthy can be reached on 571-272-0928. The fax phone numbers for the organization where this application or proceeding is assigned are 571-273-8300 for regular communications and 703-872-9307 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1600.

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